We Claim

1. An electrode array for diagnosing the presence of a disease state in a living organism, the electrode array comprising:
    a) a body;
    b) a plurality of flexible arms extending from the body; and
    c) a plurality of outer electrodes provided by the plurality of flexible arms, the outer electrodes arranged on the arms to obtain impedance measurements between respective electrodes and with at least one of the outer electrodes spaced from the body greater than the other outer electrodes.

2. An electrode array according to claim 1, wherein at least a further one of the outer electrodes is spaced from the body greater than the other outer electrodes but not as great as said at least one outer electrode.

3. An electrode array according to claim 2, wherein the further outer electrode is provided on a flexible arm adjacent to a flexible arm having the at least one outer electrode.

4. An electrode array according to claim 3, wherein the outer electrodes are arranged in electrode pairs, and each of the plurality of arms is provided with an electrode pair.

5. An electrode array according to claim 4, further comprising a plurality of inner electrodes provided on at least one of the flexible arms and positioned partway between the body and the outer electrodes.

6. An electrode array according to claim 5, wherein at least one of the inner electrodes is spaced from the body greater than the other inner electrodes.

7. An electrode array according to claim 6, wherein the at least one inner electrode is provided on the flexible arm having the at least one outer electrode.

8. An electrode array according to claim 7, wherein the inner electrodes are arranged in electrode pairs.

9. An electrode array according to claim 1, wherein the at least one outer electrode comprises a first set of electrodes having at least one electrode on each of two adjacent flexible arms.

10. An electrode array according to claim 9, wherein the outer electrodes provide for a second set of electrodes spaced from the body greater than the other outer electrodes but not as great as the first set of electrodes.

11. An electrode array according to claim 10, wherein the second set of electrodes has at least one electrode on each of two flexible arms, and said flexible arms are each adjacent to one of the flexible arms that has the first set of electrodes.

12. An electrode array according to claim 11, wherein the outer electrodes provide for a third set of electrodes spaced from the body greater than the other outer electrodes but not as great as the second set of electrodes.

13. An electrode array according to claim 12, wherein the third set of electrodes has at least one electrode provided on one flexible arm, and said flexible arm is adjacent to one of the flexible arms that has the second set of electrodes.

14. An electrode array according to claim 13, wherein the outer electrodes provide for a fourth set of electrodes spaced from the body greater than the other outer electrodes but not as great as the third set of electrodes.

15. An electrode array according to claim 14, wherein the fourth set of electrodes has at least one electrode on each of two flexible arms, and one of said flexible arms is adjacent the flexible arm that has the third set of electrodes, and the other of said flexible arms is adjacent one of the flexible arms that has the second set of electrodes.

16. An electrode array according to claim 15, wherein the remaining of the other outer electrodes are equally spaced from the body not as great as the fourth set of electrodes.

17. An electrode array according to claim 16, further comprising a plurality of inner electrodes provided on at least one of the flexible arms and positioned partway between the body and the outer electrodes.

18. An electrode array according to claim 17, wherein at least one of the inner electrodes is spaced from the body greater than the other inner electrodes.

19. An electrode array according to claim 18, further comprising a plurality of inner electrodes provided on at least one of the flexible arms and positioned partway between the body and the outer electrodes, and with at least one of the inner electrodes spaced from the body greater than the other inner electrodes and provided on one of the flexible arms having the first set of electrodes.

20. An electrode array according to claim 19, wherein at least one of the other inner electrodes is provided on one of the flexible arms having the second set of electrodes, but not adjacent to the flexible arm having the at least one inner electrode.

21. An electrode array according to claim 20, wherein at least one of the other inner electrodes is provided on the flexible arm having the third set of electrodes, and with this flexible arm not adjacent the flexible arm having both the second set of electrodes and said other inner electrodes.

22. An electrode array according to claim 21, wherein at least one of the other inner electrodes is provided on at least one other flexible arm that is not adjacent to any of the flexible arms that have the first, second, third, and fourth set of electrodes.

23. An electrode array according to claim 22, wherein the other inner electrodes are equally spaced from the body.

24. An electrode array according to claim 23, wherein the outer electrodes are arranged in electrode pairs, and each of the plurality of flexible arms is provided with an electrode pair.

25. An electrode array according to claim 24, wherein the inner electrodes are arranged in electrode pairs.

26. An electrode array according to claim 25, wherein the plurality of flexible arms are spaced around the body.

27. An electrode array according to claim 26, wherein the electrode array has twelve flexible arms spaced around the body.

28. An electrode array according to claim 27, wherein certain of the flexible arms are of different lengths to provide for the spacing of the different sets of electrodes.

29. An electrode array for diagnosing the presence of a disease state in a living organism, the electrode array comprising:
    a) a body;
    b) a plurality of flexible arms extending from the body;
    c) a plurality of electrodes provided by the plurality of flexible arms, the electrodes arranged on the arms to obtain impedance measurements between respective electrodes; and
    d) a marker provided along the central axis of at least one of the flexible arms.

30. An electrode array according to claim 29, wherein the marker is a line along the central axis of the flexible arm.

31. An electrode array according to claim 30, wherein at least the flexible arm with the marker is transparent.

32. An electrode array according to claim 31, wherein all the flexible arms are transparent.

33. An electrode array according to claim 32, wherein the flexible arm with the marker is provided with a tab at its end thereof.

34. A template for positioning an electrode array on a part of a living organism to be diagnosed for the presence of a disease state, the template comprising:
    a) an elongate body; and

b) a mark provided over at least part of the length of the body, and wherein the elongate body has an opening therein and is provided with at least one hole spaced from the opening.

35. A template according to claim 34, wherein the elongate body has a central axis and the mark is on the central axis.

36. A template according to claim 35, wherein the mark is a line along the central axis.

37. A template according to claim 36, wherein the opening and the at least one hole are spaced from one another along the central axis.

38. A template according to claim 37, wherein the opening is sized to fit around a nipple of a breast.

39. A template according to claim 38, wherein the opening is provided at one end of the elongate body, and the elongate body is of sufficient length so that when the opening is fitted around the nipple of one breast the other end of the elongate body extends to at least the nipple of the other breast.

40. A template according to claim 39, wherein the mark extends to the other end of the elongate body.

41. A template according to claim 40, wherein the elongate body is transparent.

42. A system for positioning an electrode array on a part of a living organism to be diagnosed for the presence of a disease state, the system comprising:

a) a template having:
    i. an elongate body; and
    ii. a mark provided over at least part of the length of the body,

    and wherein the elongate body has an opening therein and is provided with at least one hole spaced from the opening; and

b) an electrode array having:
    i. a body;
    ii. a plurality of flexible arms extending from the body; and
    iii. a marker provided along the central axis of at least one of the flexible arms.

43. A system according to claim 42, wherein the elongate body of the template has a central axis and the mark is on the central axis.

44. A system according to claim 43, wherein the mark is a line along the central axis.

45. A system according to claim 44, wherein the opening and the at least one hole are spaced from one another along the central axis.

46. A system according to claims 45, wherein the at least one hole in the elongate body of the template is three holes.

47. A system according to claim 46, wherein the opening in the elongate body of the template is sized to fit around a nipple of a breast.

48. A system according to claim 47, wherein the opening in the elongate body of the template is provided at one end thereof, and the elongate body is of sufficient length so that when the opening is fitted around

the nipple of one breast the other end of the elongate body extends to at least the nipple of the other breast.

49. A system according to claim 48, wherein the mark extends to the other end of the elongate body.

50. A system according to claim 49, wherein the elongate body of the template is transparent.

51. A system according to claim 50, wherein the marker of the electrode array is a line along the central axis of the flexible arm.

52. A system according to claim 51, wherein at least the flexible arm of the electrode array with the marker is transparent.

53. A system according to claim 52, wherein all the flexible arms of the electrode array are transparent.

54. A system according to claim 53, wherein the flexible arm of the electrode array with the marker is provided with a tab at its end thereof.

55. A method of positioning an electrode array on a part of a living organism to be diagnosed for the presence of a disease state, the electrode array positioned using a template, the template having an elongate body and a mark provided over at least part of the length of the body, and wherein the elongate body has an opening therein and is provided with at least one hole spaced from the opening, the electrode array having a body a plurality of flexible arms extending from the body and a marker provided along the central axis of at least one of the flexible arms, the method comprising:

a) centering the opening in the template about a nipple of one breast;
b) positioning the template about the nipple until the mark on the template is at the center of the nipple of the other breast;
c) marking the living organism through the hole in the template;
d) removing the template and centering the electrode array about the nipple of the one breast; and
e) positioning the electrode array by aligning the marker provided on the at least one flexible arm to the marking on the living organism.

56. A method according to claim 55, wherein the elongate body of the template has a central axis and the mark is on the central axis.

57. A method according to claim 57, wherein the mark is a line along the central axis.

58. A method according to claim 57, wherein the opening and the at least one hole are spaced from one another along the central axis.

59. A method according to claim 58, wherein the at least one hole in the elongate body of the template is three holes to provide for markings on the living organism that represent different electrode array sizes.

60. A method according to claim 59, wherein the elongate body of the template is transparent.

61. A method according to claim 60, wherein the marker of the electrode array is a line along the central axis of the flexible arm.

62. A method according to claim 61, wherein at least the flexible arm of the electrode array with the marker is transparent.

63. A method according to claim 62, wherein all the flexible arms of the electrode array are transparent.

64. A method according to claim 63, wherein the flexible arm of the electrode array with the marker is provided with a tab at its end thereof.

65. A method of diagnosing the possibility of a disease state in one of first and second substantially similar parts of a living organism, the method comprising:

a) obtaining a plurality of impedance measurements taken between a predetermined plurality of points encircling a first area of the parts;

b) obtaining a plurality of impedance measurements taken between a predetermined plurality of points encircling a second area of the parts, the second area at a different topology on the part than the first area;

c) obtaining a plurality of impedance measurements taken from a predetermined plurality of points between the first area and the second area;

d) producing at least one pixel plot from a chord plot produced by the impedance measurements taken; and

e) analyzing the pixel plot to diagnose the possibility of a disease state.

66. A method according to claim 65, wherein the pixel plot is a first pixel plot derived from the impedance measurements taken from the first area.

67. A method according to claim 66, wherein the pixel plot is a second pixel plot derived from the impedance measurements taken from the second area.

68. A method according to claim 67, wherein the pixel plot is a third pixel plot derived from the impedance measurements taken from between the first area and the second area.

69. A method according to claim 68, wherein the third pixel plot is the sum of separate pixel plots that can be derived from the impedance measurements taken from between each point in the first area and the plurality of points in the second area.

70. A method according to claim 69, wherein the separate pixel plots that make the third pixel plot are all mapped onto a common frame of reference.

71. A method according to claim 70, wherein the separate pixel plots are all mapped onto a common reference plane.

72. A method according to claim 71, wherein the common frame of reference is a set of orthogonal axes intersecting a predetermined point of the part of the living organism to be diagnosed.

73. A method according to claim 65, wherein the pixel plot is a plurality of pixel plots comprising a first pixel plot derived from the impedance measurements taken from the first area, a second pixel plot derived from the impedance measurements taken from the second area of the breast, and a third pixel plot derived from the impedance measurements taken between the first area and the second area.

74. A method according to claim 73, wherein the third pixel plot is the sum of separate pixel plots that can be derived from the impedance measurements taken from between each point in the first area and the plurality of points in the second area.

75. A method according to claim 74, wherein the separate pixel plots that make the third pixel plot are all mapped onto a common frame of reference.

76. A method according to claim 75, wherein the common frame of reference is a set of orthogonal axes intersecting a predetermined point of the part of the living organism to be diagnosed.

77. A method according to claim 76, wherein the separate pixel plots are all mapped onto a common reference plane.

78. A method according to claim 77, wherein the common reference plane is the body frontal plane.

79. A method according to claim 78, wherein the first pixel plot, the second pixel plot, and the third pixel plot, are all mapped onto the common frame of reference.

80. A method according to claim 79, wherein the plurality of pixel plots further comprise an integrated plot combining the first pixel plot, the second pixel plot, and the third pixel plot.

81. A method according to claim 80, wherein the part of the living organism to be diagnosed is a breast.

82. A method according to claim 81, wherein the first area is the periareolar area of the breast and the first pixel plot is a periareolar pixel plot.

83. A method according to claims 82, wherein the second area is the base area of the breast and the second pixel plot is a base pixel plot.

84. A method according to claim 83, wherein the third pixel plot is a conical pixel plot derived from impedance measurements taken from a predetermined plurality of points between the periareolar area of the breast and the base area of the breast.

85. An electrode array for diagnosing the presence of a disease state in a living organism, the electrode array comprising:

a) a body;
b) a plurality of flexible arms extending from the body; and
c) a plurality of outer electrodes provided by the plurality of flexible arms; and
d) a plurality of inner electrodes provided on at least one of the flexible arms and positioned partway between the body and the outer electrodes,

and wherein the outer electrodes and the inner electrodes are arranged on the arms to obtain impedance measurements between respective electrodes.

86. An electrode array according to claim 85, wherein the outer electrodes are arranged in electrode pairs.

87. An electrode array according to claim 86, wherein the inner electrodes are arranged in electrode pairs.

88. An electrode array according to claim 87, wherein the electrode pairs comprise a current injection electrode and a voltage measurement electrode.

89. A system for diagnosing the possibility of disease in a body part, the system comprising:
    a) electrode array containing a plurality of outer electrodes and at least one inner electrode capable of being electrically coupled to the body part;
    b) a controller switching unit; and
    c) a multiplexing unit,
    and wherein the controller switching unit and multiplexing unit allow a current to flow between any two electrodes and a resultant voltage measurement to be measured between any two electrodes.

90. The system according to claim 89, wherein the outer electrodes are arranged in electrode pairs.

91. The system according to claim 90, wherein the inner electrodes are arranged in electrode pairs.

92. The system according to claim 91, wherein the controller-switching unit and the multiplexing unit allows any one of the inner electrodes and outer electrodes to be a current injection electrode, and allows any one the inner electrodes and outer electrodes to be a voltage measurement electrode.

93. The system according to claim 92, wherein the controller-switching unit and the multiplexing unit select the current injection electrodes and the voltage measurement electrodes such that a tetrapolar measurement is taken between any two pairs of inner electrodes, any two pairs of

outer electrodes, and any two pairs of electrodes with one selected from the pairs of outer electrodes and one selected from the pairs of inner electrodes.

94. Use of an electrode array for diagnosing the presence of a disease state in a living organism, the electrode array comprising a body, a plurality of flexible arms extending from the body, a plurality of outer electrodes provided by the plurality of flexible arms, and a plurality of inner electrodes provided on at least one of the flexible arms and positioned partway between the body and the outer electrodes, the outer electrodes and the inner electrodes are arranged on the arms to obtain impedance measurements between respective electrodes, and wherein the impedance values are arranged in a mathematical matrix and mathematical analysis is performed to diagnose for the presence of a disease state.